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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,797	08/06/2001	Kanako Nishihashi		7942

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EXAMINER	
NATNAEL, PAULOS M	

ART UNIT	PAPER NUMBER
2614	

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/890,797	NISHIHASHI ET AL.	
	Examiner	Art Unit	
	Paulos M. Natnael	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amendment received 6/17/04*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4,5,9-28 and 32-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *4-,5,9-28* is/are allowed.

6)☒ Claim(s) *32-34 and 37* is/are rejected.

7)☒ Claim(s) *35 and 36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims **32-34,** and **37 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Fujino** U.S. Pat. No. **6,215,525 in view of** Chui, U.S. Pat. No. **6,496,608.**

Considering claim **32**,

a) generating and storing a virtual interpolation data in a database, wherein the virtual interpolation data includes starting position and length related to a virtual interpolation line pattern, which is generated based on an input image line data, is met by interpolated data generator 19, fig.1; (See also figs. 2-4 which show interpolated scanning lines)

b) determining an interpolation segment in the interpolation line ...is met by interpolated data phase shifter 20, fig.1, which "offsets the interpolated data Z in the horizontal direction with respect to the pixel phases on the upper and lower scanning lines by the doublers 14 and 15 for doubling the scanning lines..." (col. 3, 46-51)

Except for;

c) interpolating images in the input image lines, based on the rows of pre-interpolation pixels;

d) generating rows of pre-interpolation pixels in the input image lines, based on the virtual interpolation data and determined data of the interpolation segment;

e)...based on the virtual interpolating data stored in the **database**,

Regarding c) and d), Fujino does not specifically disclose generating a pre-interpolation pixels on the input image lines. Fujino however discloses generating the interpolation pixels A,B,C, and D in generating the interpolation data Z. Chui discloses an image data interpolation system and method, and teaches a method of interpolation (illustrated in Fig.9) by first generating fill-in pixel values (step 205), remapping pixels to locations base on actual magnification power (step 206), (which would be equivalent, given reasonably broad interpretation, to the claimed generated interpolation data), and finally generating fill-in pixel values with Barycentric or bilinear interpolation methods (step 207) . Therefore, it would have been obvious to the skilled in the art at the time the invention was made to modify the system of Fujino by providing the method of generating pixel values **before** the actual interpolation method is applied or utilized as in **Chui**, so that the image is multiplied or interpolated by a desired multiple interpolation factor.

Regarding e), Fujino does not specifically disclose a database for storing the data generated. However, Examiner takes Official Notice in that it is well known in the

art to store data generated in a data base for later retrieval, and therefore it would have been obvious to the skilled in the art at the time the invention was made to modify the reference of Fujino by providing a database making it easier to retrieve data as desired time and convenience by the operator or user or the system controller.

Considering claim **33**. (New) The image interpolation system according to claim 32, wherein the virtual interpolation data is generated by a virtual interpolation line pattern generating means, and the interpolation segment is determined by an interpolation segment determining means, and generation of the pre-interpolation pixel-rows in the input image lines and interpolation of image in the interpolation lines are performed by an interpolation implementing means.

Regarding claim 33, see rejection of claim 32;

Considering claim **34**, (New) The image interpolation system according to claim 32 or 33, wherein the virtual interpolation data generated by the virtual interpolation line pattern generating means is constructed for the input image of all lines.

Regarding claim 34, see rejection of claim 32;

Considering claim **37**, (New) An image interpolation method for interpolating an image in interpolating lines between input image lines, comprising: generating and storing a virtual interpolation data in a database, wherein the virtual interpolation data includes starting position and length related to a virtual interpolation line pattern, which is

generated based on an input image line data; determining an interpolation segment in the interpolation line, based on the virtual interpolating data stored in the database', generating rows of pre-interpolation pixels in the input image lines, based on the virtual interpolation data and determined data of the interpolation segment; and interpolating images in the input image lines, based on the rows of pre-interpolation pixels.

Regarding claim **37**, see rejection of claim 32;

Allowable Subject Matter

3. Claims **4,5, 9-28** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. Claims **35** and **36** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to disclose, an image interpolation system wherein the interpolation segment determining means comprises: a search condition setup means for setting up a pattern search range; a matching pattern condition setup means for setting up matching pattern conditions; and a first matching pattern searching means for searching for matching patterns based on the conditions designated by the search

condition setup means and by the matching pattern condition setup means, as in claim **4**;

Wherein the interpolation segment determining means comprises: a search condition setup means for setting up a pattern search range; a matching pattern condition setup means for setting up matching pattern conditions; a first matching pattern searching means for searching matching patterns based on the conditions designated by the search condition setup means and by the matching pattern condition setup means; a directional vector extracting means for extracting the direction of the vector of the detected matching patterns; and a second matching pattern searching means for searching for matching patterns existing in the extracted direction of the vector, based on the conditions designated by the search condition setup means and by the matching pattern condition setup means, as in claim **5**;

wherein the virtual interpolation data generating means comprises: an inter-pixel operating means for calculating the difference in pixel data between the pixels on the neighboring input image lines; and a normalizing means for classifying the pixels into multiple classes according to the calculated value of the difference in pixel data; and a pattern extracting means for extracting rows of pixels normalized and classified in an identical class as patterns, as in claims **11-16**; wherein the virtual interpolation data generating means comprises: an inter-pixel operating means for calculating the difference in pixel data between the pixels on the neighboring input image lines; a normalizing means for classifying the pixels into multiple classes according to the calculated value of the difference in pixel data; a pattern extracting means for extracting

rows of pixels normalized and classified in an identical class as patterns; and a coring means for judging the patterns extracted on the same line to be interpolated based on the predetermined threshold and editing them, as in claims **17-22**; and, an image interpolation system wherein the virtual interpolation line pattern generating means comprises, an inter-pixel operating means for calculating the difference in pixel data between the pixels on the neighboring input image lines; a normalizing means for classifying the pixels into multiple classes according to the calculated value of the difference in pixel data; a pattern extracting means for extracting rows of pixels normalized and classified in an identical class as patterns; and a coring means for judging the patterns extracted on the same line to be interpolated based on the predetermined threshold and editing them, as in claim **35**;

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paulos M. Natnael whose telephone number is (703) 305-0019. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Miller can be reached on (703) 305-4795. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PAULOS M. NATNAEL
PATENT EXAMINER

PMN
December 30, 2004